Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

 (Currently Amended) A laminate comprising a thermoplastic polyimide layer, and a metal layer on a surface of the thermoplastic polyimide layer,

wherein said thermoplastic polyimide layer is surface-treated by at least one treatment selected from the group consisting of a plasma treatment, a corona treatment, a coupling agent treatment, a permanganate treatment, a ultraviolet ray emitting treatment, an electron beam emitting treatment, surface treatment by colliding an abrasive at a high speed, a firing treatment, and a hydrophilization treatment.

wherein said thermoplastic polyimide layer comprises a thermoplastic polyimide which is obtained by dehydration and ring-closing a polyamic acid represented by the following general formula (1);

$$\begin{bmatrix} \begin{pmatrix} H & 0 & O & H \\ -N & 0 & H \\ -N - C & -N - X \\ OH - C & C - OH \\ 0 & 0 & -N - C \\ 0$$

wherein A is a quadrivalent organic group selected from the following formula (2), and may be the same or different; X is a divalent organic group selected from the following formula (3), and may be the same or different; B is a quadrivalent organic group other than those represented by the formula (2), and may be the same or

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

different; Y is a divalent organic group other than those represented by the formula (3), and may be the same or different; m:n is 100:0)

Formula (2)

$$\begin{array}{c} CH_{1} \\ CH_{2} \\ CH_{3} \\ CH_{4} \\ CH_{5} \\ CH_{5$$

2. (Canceled)

Appl. No. 10/537,838

Amdt. Dated April 9, 2008

Attorney Docket No. 88496.0008 Customer No.: 26021

Reply to Office Action of January 10, 2008

3. (Previously Presented) The laminate of Claim 1, wherein said

thermoplastic polyimide layer is surface-treated by means of an ion gun treatment.

4. (Previously Presented) The laminate of Claim 3, wherein said ion gun

treatment is a treatment using argon ion.

5. (Previously Presented) The laminate of Claim 1, wherein said metal layer

is formed by depositing a metal element while heating the thermoplastic polyimide

laver.

6. (Previously Presented) The laminate of Claim 5, wherein a heating

temperature is at least 100°C.

7. (Currently Amended) The laminate of any one of Claims 1, [[2,]] 3 or 4,

wherein said metal layer is an electrolessly plated layer.

8. (Previously Presented) The laminate of Claim 6, wherein said metal layer

is formed by at least one method selected from the group consisting of a sputtering method, a vacuum vapor deposition method, an ion plating method, an electron

beam vapor deposition method, and a chemical vapor deposition method.

9. (Previously Presented) The laminate of Claim 8, wherein said metal layer

comprises a first metal layer and a second metal layer.

Page 5 of 30

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

- 10. (Previously Presented) The laminate of Claim 9, wherein said first metal layer comprises nickel, cobalt, chrome, titanium, molybdenum, tungsten, zinc, tin, indium, gold, or an alloy thereof.
- (Previously Presented) The laminate of Claim 10, wherein said second metal layer comprises copper or an alloy thereof.
 - 12. (Currently Amended) A laminate comprising

a non-thermoplastic polyimide layer having a thermoplastic polyimide layer on at least one face; and

a metal layer formed on at least one face of surfaces of said thermoplastic polyimide layer,

wherein said thermoplastic polyimide layer is surface-treated by at least one treatment selected from the group consisting of a plasma treatment, a corona treatment, a coupling agent treatment, a permanganate treatment, a ultraviolet ray emitting treatment, an electron beam emitting treatment, surface treatment by colliding an abrasive at a high speed, a firing treatment, and a hydrophilization treatment,

wherein said thermoplastic polyimide layer comprises a thermoplastic polyimide which is obtained by dehydration and ring-closing a polyamic acid represented by the following general formula (1);

$$\begin{bmatrix} \begin{pmatrix} H & O & O & H \\ I & I & I & I \\ N-C & C-N-X \\ OH-C & A & C-OH \\ I & I & I \\ O & O & M \\ \end{bmatrix} \begin{pmatrix} H & O & O & H \\ I-I & I & I & I \\ N-C & C-N-Y \\ OH-C & B & C-OH \\ I & I & I \\ O & O & N \\ \end{bmatrix}$$
 (1)

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

wherein A is a quadrivalent organic group selected from the following formula (2), and may be the same or different; X is a divalent organic group selected from the following formula (3), and may be the same or different; B is a quadrivalent organic group other than those represented by the formula (2), and may be the same or different; Y is a divalent organic group other than those represented by the formula (3), and may be the same or different; m:n is 100:0)

Formula (2)

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

$$\begin{array}{c} C_{H_1} \\ C_{C_{H_1}} \\$$

13. (Currently Amended) A laminate comprising

a thermoplastic polyimide layer and a metal layer formed on said thermoplastic polyimide layer on one surface, and an adhesive layer on the other face,

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

wherein said thermoplastic polyimide layer is surface-treated by at least one treatment selected from the group consisting of a plasma treatment, a corona treatment, a coupling agent treatment, a permanganate treatment, a ultraviolet ray emitting treatment, an electron beam emitting treatment, surface treatment by colliding an abrasive at a high speed, a firing treatment, and a hydrophilization treatment,

wherein said thermoplastic polyimide layer comprises a thermoplastic polyimide which is obtained by dehydration and ring-closing a polyamic acid represented by the following general formula (1):

wherein A is a quadrivalent organic group selected from the following formula (2), and may be the same or different; X is a divalent organic group selected from the following formula (3), and may be the same or different; B is a quadrivalent organic group other than those represented by the formula (2), and may be the same or different; Y is a divalent organic group other than those represented by the formula (3), and may be the same or different; m; n is 100:0)

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

14. (Currently Amended) A laminate comprising

a thermoplastic polyimide layer and a metal layer formed on said thermoplastic polyimide layer on one surface, and a copper foil on the other face,

wherein said thermoplastic polyimide layer is surface-treated by at least one treatment selected from the group consisting of a plasma treatment, a corona treatment, a coupling agent treatment, a permanganate treatment, a ultraviolet ray emitting treatment, an electron beam emitting treatment, surface treatment by colliding an abrasive at a high speed, a firing treatment, and a hydrophilization treatment.

wherein said thermoplastic polyimide layer comprises a thermoplastic polyimide which is obtained by dehydration and ring-closing a polyamic acid represented by the following general formula (1):

$$\begin{bmatrix} \begin{pmatrix} H & O & O & H \\ I & \parallel & \parallel & \parallel & \parallel \\ N-C & C-N-X \end{pmatrix} & \begin{pmatrix} H & O & O & H \\ I & \parallel & \parallel & \parallel & \parallel \\ N-C & C-N-Y \end{pmatrix} & \begin{pmatrix} OH-C & C-N-Y \\ I & \parallel & \parallel & \parallel \\ OH-C & \parallel & \parallel & \parallel \\ O & O & O & n \end{pmatrix}$$
 (1)

wherein A is a quadrivalent organic group selected from the following formula (2), and may be the same or different; X is a divalent organic group selected from the following formula (3), and may be the same or different; B is a quadrivalent organic

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

group other than those represented by the formula (2), and may be the same or different; Y is a divalent organic group other than those represented by the formula (3), and may be the same or different; m:n is 100:0)

$$\begin{array}{c} CH_1 \\ CH_2 \\ CH_3 \\ CH_4 \\ CH_5 \\ CH_5 \\ CH_5 \\ CH_5 \\ CH_6 \\ CH_7 \\ CH_7 \\ CH_7 \\ CH_8 \\ CH$$

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008 Attorney Docket No. 88496.0008 Customer No.: 26021

15. (Canceled)

- 16. (Previously Presented) The laminate of any one of Claims 12, 13, or 14, wherein said thermoplastic polyimide layer is surface-treated by an ion gun treatment.
- 17. (Previously Presented) The laminate of Claim 16, wherein said ion gun treatment is a treatment using argon ion.
- 18. (Previously Presented) The laminate of Claim 12, 13, or 14, wherein said metal layer is formed by depositing a metal element while heating the thermoplastic polyimide layer.
- (Previously presented) The laminate of Claim 18, wherein a heating temperature is at least 100°C.
- 20. (Currently Amended) A laminate comprising a polyimide film and a metal layer,

wherein said polyimide film is at least two-layered structure which comprises a non-thermoplastic polyimide layer and a thermoplastic polyimide layer formed on at least one face of the non-thermoplastic polyimide layer; and said metal layer comprises a first metal layer which comprises nickel, cobalt, chrome, titanium.

Appl. No. 10/537,838 Amdt. Dated April 9, 2008 Reply to Office Action of January 10, 2008

molybdenum, tungsten, zinc, tin, indium, gold, or an alloy thereof, and a second metal layer which comprises copper or an alloy thereof on the first metal layer,

wherein said thermoplastic polyimide layer is surface-treated by at least one treatment selected from the group consisting of a plasma treatment, a corona treatment, a coupling agent treatment, a permanganate treatment, a ultraviolet ray emitting treatment, an electron beam emitting treatment, surface treatment by colliding an abrasive at a high speed, a firing treatment, and a hydrophilization treatment.

wherein said thermoplastic polyimide layer comprises a thermoplastic polyimide which is obtained by dehydration and ring-closing a polyamic acid represented by the following general formula (1);

$$\begin{bmatrix} \begin{pmatrix} H & O & O & H \\ | & | & | & | \\ N-C & C-N-X \\ OH-C & C-OH \\ | & | & | \\ O & O \\ \end{bmatrix} & \begin{pmatrix} H & O & O & H \\ | & | & | & | \\ N-C & C-N-Y \\ OH-C & B & C-OH \\ | & | & | & | \\ O & O & n \\ \end{bmatrix} & \underbrace{ \begin{pmatrix} H & O & O & H \\ | & | & | & | \\ C-N-Y \\ | & | & | & | \\ O & O & n \\ \end{bmatrix} }_{n}$$

wherein A is a quadrivalent organic group selected from the following formula (2), and may be the same or different; X is a divalent organic group selected from the following formula (3), and may be the same or different; B is a quadrivalent organic group other than those represented by the formula (2), and may be the same or different; Y is a divalent organic group other than those represented by the formula (3), and may be the same or different; m:n is 100:0)

Formula (2)

$$\begin{array}{c} \overset{CH_1}{-} & \overset{CF_1}{-} & \overset{CF_2}{-} & \overset{CF_3}{-} & \overset{CF_4}{-} & \overset{CF_4}{-} & \overset{CF_4}{-} & \overset{CF_4}{-} & \overset{CF_4}{-} & \overset{CF_4}{-} & \overset{CH_3}{-} & \overset{CH_3}{-}$$

21. (Canceled)

Appl. No. 10/537,838 Attorney Docket No. 88496.0008 Amdt. Dated April 9, 2008 Customer No.: 26021

Reply to Office Action of January 10, 2008

22. (Previously Presented) The laminate of any one of Claims 12, 13, 14, or 20, wherein thickness of said thermoplastic polyimide layer is at least 0.01 µm to at

most 10 µm, and is thicker than the non-thermoplastic polyimide layer.

23. (Canceled)

24. (Original) A method for preparing a printed circuit board, which

comprises the steps of:

forming a thermoplastic polyimide resin layer on one face of a non-

thermoplastic polyimide film,

forming an adhesive layer on the other face of the non-thermoplastic

polyimide film,

opposing the adhesive layer and a circuit face of a circuit-formed circuit board

to each other to laminate in accordance with a method using heating and/or

pressurization, and

carrying out panel plating in accordance with a physical vapor deposition

method on a thermoplastic polyimide layer surface after laminating.

25. (Currently Amended) A method for preparing a printed circuit board

which comprises the steps of;

forming a thermoplastic polyimide resin layer on one face of a non-

thermoplastic polyimide film,

laminating [[the]] an other face of the non-thermoplastic polyimide film on a

circuit-formed circuit board via an adhesive sheet in accordance with a method

using heating and/or pressurization; and

Appl. No. 10/537,838 Attorney Docket No. 88496.0008
Amdt. Dated April 9, 2008 Customer No.: 26021
Reply to Office Action of January 10, 2008

carrying out panel plating in accordance with a physical vapor deposition method on a thermoplastic polyimide layer surface after laminating.